**Q1. What is a probability distribution, exactly? If the values are meant to be random, how can you**

**predict them at all?**

**Q2. Is there a distinction between true random numbers and pseudo-random numbers, if there is**

**one? Why are the latter considered “good enough”?**

**Q3. What are the two main factors that influence the behaviour of a &quot;normal&quot; probability distribution?**

**Q4. Provide a real-life example of a normal distribution.**

**Q5. In the short term, how can you expect a probability distribution to behave? What do you think will**

**happen as the number of trials grows?**

**Q6. What kind of object can be shuffled by using random.shuffle?**

**Q7. Describe the math package&#39;s general categories of functions.**

**Q8. What is the relationship between exponentiation and logarithms?**

**Q9. What are the three logarithmic functions that Python supports?**

**SOLUTIONS**

*1. A probability distribution is a function that describes the likelihood of different outcomes in a random event. It can be used to predict the likelihood of different outcomes, but the values themselves are random and cannot be precisely predicted. The probability distribution gives us information about the possible outcomes and their relative probabilities.*

*2. True random numbers are generated by physical processes that are inherently unpredictable, such as radioactive decay or atmospheric noise. Pseudo-random numbers, on the other hand, are generated by algorithms that use a deterministic process to produce a sequence of numbers that appear random. While they are not truly random, they are considered "good enough" for many practical purposes, such as simulations or cryptography.*

*3. The two main factors that influence the behavior of a normal probability distribution are the mean and standard deviation of the distribution. The mean determines the center of the distribution, while the standard deviation determines its spread.*

*4. A real-life example of a normal distribution is the distribution of heights or weights in a population. In general, many physical and social phenomena can be modeled using a normal distribution, such as test scores, blood pressure readings, or stock prices.*

*5. In the short term, a probability distribution can behave in many different ways, depending on its specific parameters. However, as the number of trials grows, the distribution tends to converge to its expected value, becoming more predictable and consistent.*

*6. The random.shuffle function can be used to shuffle any sequence or list in place, such as a deck of cards or a playlist of songs.*

*7. The math package in Python contains several categories of functions, including basic mathematical functions (such as trigonometric functions), numerical methods (such as root-finding algorithms), and special functions (such as the gamma function or Bessel functions).*

*8. Exponentiation and logarithms are inverse operations of each other. If we take the logarithm of a number with a given base, we can obtain the exponent needed to raise the base to the original number. Similarly, if we raise a base to a certain exponent, we can obtain the corresponding logarithm of the resulting number.*

*9. Python supports three logarithmic functions: math.log(x) computes the natural logarithm of x, math.log10(x) computes the base-10 logarithm of x, and math.log2(x) computes the base-2 logarithm of x.*